made thereto without departing from the spirit and scope of the invention as set forht in the hereafter appended claims.

ABSTRACT OF THE DISCLOSURE

A method for extending the switching matrix of a communication system without interruption which is effected by reserving space for the routing addresses of the largest extension stage both in the header translation table of the interface devices and in the cell header of each ATM cell, and by providing a system split which is used to replace the old switching matrix assemblies with new switching matrix assemblies in steps, the paths via the new switching matrix assemblies, insofar as they lead to the same output-side interface devices as via the old switching matrix assemblies, being addressable using the same routing addresses.

In the claims:

On page 7, cancel line 1 and substitute the following left-hand justified heading therefor:

We Claims as Our Invention:

Please cancel claims 1-5, without prejudice and substitute the following claims therefor:

6. A method for extending a switching matrix, which is in redundant form, of a communication system without interruption, the switching matrix having a plurality of switching matrix assemblies via which a plurality of cell streams having ATM cells are routed as stipulated by a routing address placed in front of a cell header, the routing address taking up a prescribed memory space requirement, the method comprising the steps of:

reserving additional memory space for storing the routing address of a largest required switching matrix extension both in a header translation table and in the cell header of each ATM cell by placing at least one zero in front of the routing address;

performing a system split which is used to replace old switching matrix assemblies with new switching matrix assemblies in steps;

533 Rec'd PCT/PTO 06 SEP 2001

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): Eckhardt Belgardt et al.			Docket No. 112740-220
Serial No. 09/856,064	Filing Date May 17, 2001	Examiner Unknown	Group Art Unit Unknown

Invention: METHOD FOR EXTENDING THE SWITCHING MATRIX OF A COMMUNICATION SYSTEM WITHOUT INTERRUPTION

I hereby certify that the following correspondence:

Transmittal Letter to the United States Designated/Elected Office(Duplicate); Notification of Missing Requirements Under 35 USC 371 in the United States Designated/Elected Office; Declaration and Power of Attorney (4 Pages); Check in the Amount of $130.00; and Return Receipt Postcard.

(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231 on

September 6, 2001
(Date)

Robert J. Buccieri
(Typed or Printed Name of Person Mailing Correspondence)

(Signature of Person Mailing Correspondence)

EL 704941330 US
("Express Mail" Mailing Label Number)

Note: Each paper must have its own certificate of mailing.

FORM PTO-1390 (Modified) (REV 11-98) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER
112740-220

JC18 Rec'd PCT/PTO 17 MAY 2001

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR
09/856064

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE99/03655	17 November 1999	17 November 1998

TITLE OF INVENTION
METHOD FOR EXTENDING THE SWITCHING MATRIX OF A COMMUNICATION SYSTEM WITHOUT INTERRUPTION

APPLICANT(S) FOR DO/EO/US
Eckhardt Belgardt et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☒ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
9. ☒ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

Submission of Drawings - Figure 1 on one sheet

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/856064	PCT/DE99/03655	112740-220

21. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :		CALCULATIONS PTO USE ONLY
☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO	$1,000.00	
☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	$860.00	
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	$710.00	
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)	$690.00	
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4)	$100.00	

JC18 Rec'd PCT/PTO 17 MAY 2001

ENTER APPROPRIATE BASIC FEE AMOUNT =				$860.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				$0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	5 - 20 =	0	x $18.00	$0.00	
Independent claims	1 - 3 =	0	x $80.00	$0.00	
Multiple Dependent Claims **(check if applicable)**.			☐	$0.00	
TOTAL OF ABOVE CALCULATIONS			=	$860.00	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) **(check if applicable).**			☐	$0.00	
SUBTOTAL			=	$860.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).			+	$0.00	
TOTAL NATIONAL FEE			=	$860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).**			☐	$0.00	
TOTAL FEES ENCLOSED			=	$860.00	
				Amount to be: refunded	$
				charged	$

☒ A check in the amount of **$860.00** to cover the above fees is enclosed.

☐ Please charge my Deposit Account No. in the amount of to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **02-1818** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

William E. Vaughan (Reg. No. 39,056)
Bell, Boyd & Lloyd LLC
P.O. Box 1135
Chicago, Illinois 60690

SIGNATURE

William E. Vaughan
NAME

39, 056
REGISTRATION NUMBER

May 17, 2001
DATE

BOX PCT

IN THE UNITED STATES ELECTED/DESIGNATED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER I

PRELIMINARY AMENDMENT

APPLICANTS:	Eckhardt Belgardt et al.	DOCKET NO: 112740-220
SERIAL NO:		GROUP ART UNIT:
		EXAMINER:
INTERNATIONAL APPLICATION NO:		PCT/DE99/03655
INTERNATIONAL FILING DATE:		17 November 1999
INVENTION:	METHOD FOR EXTENDING THE SWITCHING MATRIX OF A COMMUNICATION SYSTEM WITHOUT INTERRUPTION	

Assistant Commissioner for Patents,
Washington, D.C. 20231

Sir:

Please amend the above-identified International Application before entry into the National stage before the U.S. Patent and Trademark Office under 35 U.S.C. §371 as follows:

In the Specification:

Please replace the Specification of the present application, including the Abstract, with the following Substitute Specification:

SPECIFICATION

TITLE

METHOD FOR EXTENDING THE SWITCHING MATRIX OF A COMMUNICATION SYSTEM WITHOUT INTERRUPTION

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method for extending a switching matrix of a communication system without interruption, wherein the switching matrix has a number of switching matrix assemblies via which a number of cell streams having ATM cells are routed as stipulated by a routing address placed in front of a

cell header, and the routing address taking up a prescribed memory space requirement.

Description of the Prior Art

Generally, the switching matrix can be regarded as the central part of a communication system. The switching matrix has a number of assemblies through which the information for all the connections is routed. If the connection capacity of a communication system is to be extended, the switching matrix, as central part, needs to be enlarged in particular. This is particularly true, also, for switching matrices which connect and transmit information packaged in ATM cells.

Contemporary ATM switching matrices are extended by replacing the old switching matrix components with new components. Extension in terms of adding new components to the old components in modular fashion, with the old components being able to be used as previously, is carried out only rarely. The switching matrix therefore generally needs to be completely restructured.

This has consequences both for the operating system and for the path information of the ATM cells which are to be connected. In particular, the routing addresses which show the path to the ATM cell within the switching matrix need to be changed appropriately once the switching matrix has been changed over. During operation of the switching matrix, this cannot be done, or can be done only with great complexity. In the case of this prior art, to extend the switching matrix, operation is therefore interrupted and the switching matrix is completely disconnected. This then allows the switching matrix to be changed over and the routing addresses to be changed.

The document "A Scalable ATM Switching System Architecture", Wolfgang Fischer et al., IEEE Journal of Selected Areas in Communications, 9(1991) October, No. 8, New York, US discloses the architecture of an ATM switching system. Specific measures to be taken in order to add equipment to the switching matrix of the ATM switching system during ongoing operation are not addressed in this case, however.

In addition, US patent specification US 5,325,089 likewise discloses an extendable ATM switching matrix. The extension is described here in detail within

the context of how the individual stages need to be wired together. Specific measures to be taken in order to add equipment to the switching matrix of the ATM switching system during ongoing operation without any great complexity are also not addressed in this case.

The present invention is directed to demonstrating a way in which switching matrices can be extended without disrupting operation.

SUMMARY OF THE INVENTION

Accordingly, the present invention involves a method for extending a switching matrix, which is in redundant form, of a communication system without interruption, wherein the switching matrix has a number of switching matrix assemblies which a number of cell streams having ATM cells are routed as stipulated by a routing address placed in front of a cell header, the routing address taking up a prescribed memory space requirement, the method including the steps of: reserving additional memory space for storing the routing address of a largest required switching matrix extension both in a header translation table and in the cell header of each ATM cell by placing at least one zero in front of the routing address; performing a system split which is used to replace old switching matrix assemblies with new switching matrix assemblies in steps; addressing, in the new switching matrix assemblies and insofar as the new switching matrix assemblies connect paths to a same output as the old switching matrix assemblies, the paths using the same routing addresses; and writing the new routing addresses for the paths via the extended switching matrix to the additional memory space.

An advantage of the present invention is, in particular, that sufficient memory space is reserved for the routing addresses. In addition, there is the assurance that the routing addresses of the ATM cells are identical for each switching matrix type. In practice, this results in, at the actual startup of the switching matrix, the routing address always being configured for the largest switching matrix type. The routing addresses for the paths via the new switching matrix assemblies thus remain unchanged from the old ones. As such, existing connections can remain unchanged, and paths via the extended part of the switching matrix which have the already reserved extended routing addresses used

for them now need only have the extended routing addresses entered for them in the extended memory space. The switching matrix is then changed over using a system split. Such a procedure has the associated advantage that the changeover can occur during ongoing operation, and existing connections do not need to be terminated.

Additional features and advantages of the present invention are described in, and will be apparent from, the Detailed Description of the Preferred Embodiments and the Drawings.

DESCRIPTION OF THE DRAWINGS

Figure 1 shows a switching matrix of a communication system which is used in connection with the method of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Accordingly, a switching matrix ASN is shown which is split into 2 halves ASN_0 and ASN_1. In addition, redundantly arranged assemblies AMX, SMU and ASNCORE are shown which respectively form the switching matrix halves ASN_0 and ASN_1. The assemblies AMX are in the form of ATM multiplexers whose task is to multiplex ATM cell streams onto the devices SMU which follow. The latter execute random multiplex methods, according to the rules of which ATM cells are removed from a memory (not shown in more detail) and are supplied to the devices connected downstream. The devices ASNCORE represent the core of the switching matrix ASN, which is responsible for switching through the connections. The input-side devices AMX, SMU_0, ASNCORE of the switching matrix half ASN_0 are connected to one another via converged lines B_0, B_1 in redundant form. The same applies to the output-side devices ASNCORE, SMU_0, AMX of the switching matrix half ASN_0. The action taken is similar in the case of the connections for the input-side and output-side devices of the switching matrix half ASN_1. Arranged on the input and output sides of the switching matrix ASN are interface devices LIC used for receiving and outputting the ATM cells.

The arriving ATM cells are split into 2 identical ATM cell streams in the interface devices LIC and are supplied via the respective input-side devices AMX, SMU, ASNCORE arranged in redundant form to the output-side devices AMX,

SMU (which are likewise arranged in redundant form), where they are forwarded via the output-side interface devices LIC. There, an algorithm RPC is executed which decides which of the arriving identical ATM cells is forwarded.

A connection between 2 subscribers is now set up by virtue of a signaling cell first being transmitted from the sending subscriber to the receiving subscriber. In this process, the path which the ATM cells are later to take is stipulated. Ascertainment of this path is controlled and stored by a central computer CP. This computer thus has an up-to-date map of all connections.

In addition, routing addresses are stipulated. The routing address stipulates the output port of the switching matrix. If, by way of example, the device AMX arranged on the output side is connected to port 10 of the switching matrix ASN, the routing address contains "10" in this case. On the basis of the routing addresses, the switching matrix ASN automatically "knows" the port to which the ATM cell needs to be routed. The routing address is also part of an internal cell header placed in front of the ATM cell in the interface device LIC.

A cell stream's ATM cells arriving in an input-side interface device LIC are now given the internal cell header which, among other things, stipulates the path through the switching matrix in the form of a routing address. The routing address stipulates the output via which the relevant ATM cell leaves the switching matrix ASN again. In addition, the cell stream is split into 2 redundant cell streams Z_0, Z_1. The two cell streams are then supplied to the relevant output via different paths. The output-side interface device LIC associated with this output receives both cell streams Z_0, Z_1. An algorithm RPC being executed therein then decides which of the redundant ATM cells is supplied to further devices.

In addition, upon startup, all the devices of the communication system are initialized and brought up to speed. These operations are likewise controlled by the central computer CP. In addition, the length of the routing address in the internal cell header is stipulated by the hardware. This length is assigned to the assemblies in a header translation table.

The present invention now provides that, upon startup of the communication system, sufficient memory space is reserved for later extension of

the routing address. This is done by placing one or more zeros in front of the actual address.

To change over the switching matrix, a system split is first performed. In this context, one half, e.g. ASN_0, of the switching matrix ASN is first disconnected by a software command. The traffic routed via the half ASN_0 is then interrupted. The cell streams routed via the second half, associated in redundant form, e.g. ASN_1, are forwarded by the algorithm RPC. If the new assemblies of the first half ASN_0 have been installed, these new assemblies are tested and activated in steps. As soon as all the assemblies of the first half are active, the traffic is transmitted via both halves again. In this intermediate state, the switching matrix is thus (briefly) operated using a switching matrix half which includes old switching matrix assemblies and a switching matrix half which includes new switching matrix assemblies.

Subsequently, the second half, e.g. ASN_1, is then disconnected. The traffic routed via the half ASN_1 is then interrupted. The cell streams routed via the first half, associated in redundant form, e.g. ASN_0, are forwarded by the algorithm RPC. If the new assemblies of the second half ASN_1 have been installed, the assemblies of the second half ASN_1 are tested and activated in steps. As soon as all the assemblies of the second half are active, the traffic is transmitted via both halves again.

A fundamental feature is thus that the switching matrix is changed over such that the routing addresses can remain unchanged during extension. To this end, the routing address for a configuration which is of an appropriately small size is allocated as though the small configuration were part of the largest configuration. This is done by virtue of the personnel providing appropriate wiring. The addresses therefore remain the same. The redundancy can therefore be utilized in order to extend the switching matrix with the associated random multiplex unit without interruption.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be

addressing, in the new switching matrix assemblies and insofar as the new switching matrix assemblies connect paths to a same output as the old switching matrix assemblies, the paths using the same routing addresses; and

writing the new routing addresses for the paths via the extended switching matrix to the additional memory space.

7. A method for extending a switching matrix of a communication system without interruption as claimed in claim 6, wherein the system split is performed by disconnecting half of the old switching matrix and replacing it with a new switching matrix half, the cell streams being routed via a remaining half of the old switching matrix, wherein the disconnected half is then started up again using the new switching matrix, as a result of which one half of the switching matrix is operated using the new switching matrix half and the remaining half is operated using the old switching matrix, wherein the remaining half of the old switching matrix is then disconnected and replaced with another new switching matrix half via which the cell streams are routed, and wherein the remaining half is then started up again using the another new switching matrix.

8. A method for extending a switching matrix of a communication system without interruption as claimed in claim 6, wherein, in input-side interface devices, the cell header of each ATM cell has an internal cell header placed in front of it which is used to hold the routing addresses and is removed again in output-side interface devices.

9. A method for extending a switching matrix of a communication system without interruption as claimed in claim 6, wherein, in input-side interface devices, arriving cell streams are split into two separate and identical cell streams such that a first cell stream is routed via one half of the switching matrix and a second cell stream is routed via the remaining half of the switching matrix to the same output-side interface devices as stipulated by the routing address placed in front of the cell header.

10. A method for extending a switching matrix of a communication system without interruption as claimed in claim 6, wherein the additional memory space is reserved for the largest required switching matrix extension both in the header translation table and in the cell header of each ATM cell.

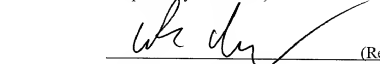
REMARKS

The present amendment makes editorial changes and corrects typographical errors in the specification, which includes the Abstract, in order to conform the specification to the requirements of United States Patent Practice. No new matter is added thereby. Attached hereto is a marked-up version of the changes made to the specification by the present amendment. The attached page is captioned "**Version With Markings To Show Changes Made**".

In addition, the present amendment cancels original claims 1-5 in favor of new claims 6-10. Claims 6-10 have been presented solely because the revisions by red-lining and underlining which would have been necessary in claims 1-5 in order to present those claims in accordance with preferred United States Patent Practice would have been too extensive, and thus would have been too burdensome. The present amendment is intended for clarification purposes only and not for substantial reasons related to patentability pursuant to 35 USC §§103, 102, 103 or 112. Indeed, the cancellation of claims 1-5 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims 1-5.

Early consideration on the merits is respectfully requested.

Respectfully submitted,



(Reg. No. 39,056)

William E. Vaughan
Bell, Boyd & Lloyd LLC
P.O. Box 1135
Chicago, Illinois 60690-1135
(312) 807-4292
Attorneys for Applicants

VERSIONS WITH MARKINGS TO SHOW CHANGES MADE

In The Specification:

The Specification of the present application, including the Abstract, has been amended as follows:

SPECIFICATION

TITLE

~~**Method for extending the switching matrix of a communication system without interruption**~~

METHOD FOR EXTENDING THE SWITCHING MATRIX OF A COMMUNICATION SYSTEM WITHOUT INTERRUPTION

BACKGROUND OF THE INVENTION

Field of the Invention

~~Description~~

~~The invention relates to a method in accordance with the precharacterizing clause of patent claim 1.~~

The present invention relates to a method for extending a switching matrix of a communication system without interruption, wherein the switching matrix has a number of switching matrix assemblies via which a number of cell streams having ATM cells are routed as stipulated by a routing address placed in front of a cell header, and the routing address taking up a prescribed memory space requirement.

Description of the Prior Art

Generally, the switching matrix can be regarded as the central part of a communication system. The switching matrix has a ~~plurality~~ number of assemblies through which the information for all the connections is routed. If the connection capacity of a communication system is to be extended, the switching matrix, as central part, needs to be enlarged in particular. This is particularly true, also, for switching matrices which connect and transmit information packaged in ATM cells.

Contemporary ATM switching matrices are extended by replacing the old switching matrix components with new components. Extension in terms of adding

new components to the old components in modular fashion, with the old components being able to be used as previously, is carried out only rarely. The switching matrix therefore generally needs to be completely restructured.

This has consequences both for the operating system and for the path information of the ATM cells which are to be connected. In particular, the routing addresses which show the path to the ATM cell within the switching matrix need to be changed appropriately once the switching matrix has been changed over. During operation of the switching matrix, this cannot be done, or can be done only with great complexity. In the case of this prior art, to extend the switching matrix, operation is therefore interrupted and the switching matrix is completely disconnected. This then allows the switching matrix to be changed over and the routing addresses to be changed.

The document "A Scalable ATM Switching System Architecture", Wolfgang Fischer et al., IEEE Journal of Selected Areas in Communications, 9(1991) October, No. 8, New York, US discloses the architecture of an ATM switching system. Specific measures to be taken in order to add equipment to the switching matrix of the ATM switching system during ongoing operation are not addressed in this case, however.

In addition, US patent specification US 5,325,089 likewise discloses an extendable ATM switching matrix. The extension is described here in detail within the context of how the individual stages need to be wired together. Specific measures to be taken in order to add equipment to the switching matrix of the ATM switching system during ongoing operation without any great complexity are also not addressed in this case.

The present invention is ~~based on the object of~~ directed to demonstrating a way in which switching matrices can be extended without disrupting operation.

~~The object is achieved, on the basis of the features specified in the precharacterizing clause of patent claim 1, by the features of the characterizing part.~~

SUMMARY OF THE INVENTION

Accordingly, the present invention involves a method for extending a switching matrix, which is in redundant form, of a communication system without interruption, wherein the switching matrix has a number of switching matrix assemblies which a number of cell streams having ATM cells are routed as stipulated by a routing address placed in front of a cell header, the routing address taking up a prescribed memory space requirement, the method including the steps of: reserving additional memory space for storing the routing address of a largest required switching matrix extension both in a header translation table and in the cell header of each ATM cell by placing at least one zero in front of the routing address; performing a system split which is used to replace old switching matrix assemblies with new switching matrix assemblies in steps; addressing, in the new switching matrix assemblies and insofar as the new switching matrix assemblies connect paths to a same output as the old switching matrix assemblies, the paths using the same routing addresses; and writing the new routing addresses for the paths via the extended switching matrix to the additional memory space.

An advantage of the present invention is, in particular, that sufficient memory space is reserved for the routing addresses. In addition, there is the assurance that the routing addresses of the ATM cells are identical for each switching matrix type. In practice, this ~~means that~~ results in, at the actual startup of the switching matrix, the routing address ~~is~~ always being configured for the largest switching matrix type. The routing addresses for the paths via the new switching matrix assemblies thus remain unchanged from the old ones. ~~This means that~~ As such, existing connections can remain unchanged, and paths via the extended part of the switching matrix which have the already reserved extended routing addresses used for them now need only have the extended routing addresses entered for them in the extended memory space. The switching matrix is then changed over using a system split. Such a procedure has the associated advantage that the changeover can occur during ongoing operation, and existing connections do not need to be terminated.

~~Advantageous developments of the invention are specified in the subclaims.~~

~~The invention is explained in more detail below with reference to a figure.~~

Additional features and advantages of the present invention are described in, and will be apparent from, the Detailed Description of the Preferred Embodiments and the Drawings.

DESCRIPTION OF THE DRAWINGS

Figure 1 shows a switching matrix of a communication system which is used in connection with the method of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Accordingly, a switching matrix ASN is shown which is split into 2 halves ASN_0 and ASN_1. In addition, redundantly arranged assemblies AMX, SMU and ASNCORE are shown which respectively form the switching matrix halves ASN_0 and ASN_1. The assemblies AMX are in the form of ATM multiplexers whose task is to multiplex ATM cell streams onto the devices SMU which follow. The latter execute random multiplex methods, according to the rules of which ATM cells are removed from a memory (not shown in more detail) and are supplied to the devices connected downstream. The devices ASNCORE represent the core of the switching matrix ASN, which is responsible for switching through the connections. The input-side devices AMX, SMU_0, ASNCORE of the switching matrix half ASN_0 are connected to one another ~~by means of~~ via converged lines B_0, B_1 in redundant form. The same applies to the output-side devices ASNCORE, SMU_0, AMX of the switching matrix half ASN_0. The action taken is similar in the case of the connections for the input-side and output-side devices of the switching matrix half ASN_1. Arranged on the input and output sides of the switching matrix ASN are interface devices LIC used for receiving and outputting the ATM cells.

The arriving ATM cells are split into 2 identical ATM cell streams in the interface devices LIC and are supplied via the respective input-side devices AMX, SMU, ASNCORE arranged in redundant form to the output-side devices AMX, SMU (which are likewise arranged in redundant form), where they are forwarded via the output-side interface devices LIC. There, an algorithm RPC is executed which decides which of the arriving identical ATM cells is forwarded.

A connection between 2 subscribers is now set up by virtue of a signaling cell first being transmitted from the sending subscriber to the receiving subscriber. In this process, the path which the ATM cells are later to take is stipulated. Ascertainment of this path is controlled and stored by a central computer CP. This computer thus has an up-to-date map of all connections.

In addition, routing addresses are stipulated. The routing address stipulates the output port of the switching matrix. If, by way of example, the device AMX arranged on the output side is connected to port 10 of the switching matrix ASN, the routing address contains "10" in this case. On the basis of the routing addresses, the switching matrix ASN automatically "knows" the port to which the ATM cell needs to be routed. The routing address is also part of an internal cell header placed in front of the ATM cell in the interface device LIC.

A cell stream's ATM cells arriving in an input-side interface device LIC are now given the internal cell header, which, among other things, stipulates the path through the switching matrix in the form of a routing address. The routing address stipulates the output via which the relevant ATM cell leaves the switching matrix ASN again. In addition, the cell stream is split into 2 redundant cell streams Z_0, Z_1. The two cell streams are then supplied to the relevant output via different paths. The output-side interface device LIC associated with this output receives both cell streams Z_0, Z_1. An algorithm RPC being executed therein then decides which of the redundant ATM cells is supplied to further devices.

In addition, upon startup, all the devices of the communication system are initialized and brought up to speed. These operations are likewise controlled by the central computer CP. In addition, the length of the routing address in the internal cell header is stipulated by the hardware. This length is assigned to the assemblies in a header translation table.

The present invention now provides that, upon startup of the communication system, sufficient memory space is reserved for later extension of the routing address. This is done by placing one or more zeros in front of the actual address.

To change over the switching matrix, a system split is first performed. In this context, one half, e.g. ASN_0, of the switching matrix ASN is first disconnected by a software command. The traffic routed via the half ASN_0 is then interrupted. The cell streams routed via the second half, associated in redundant form, e.g. ASN_1, are forwarded by the algorithm RPC. If the new assemblies of the first half ASN_0 have been installed, these new assemblies are tested and activated in steps. As soon as all the assemblies of the first half are active, the traffic is transmitted via both halves again. In this intermediate state, the switching matrix is thus (briefly) operated using a switching matrix half which ~~comprises~~ includes old switching matrix assemblies and a switching matrix half which ~~comprises~~ includes new switching matrix assemblies.

Subsequently, the second half, e.g. ASN_1, is then disconnected. The traffic routed via the half ASN_1 is then interrupted. The cell streams routed via the first half, associated in redundant form, e.g. ASN_0, are forwarded by the algorithm RPC. If the new assemblies of the second half ASN_1 have been installed, the assemblies of the second half ASN_1 are tested and activated in steps. As soon as all the assemblies of the second half are active, the traffic is transmitted via both halves again.

A fundamental feature is thus that the switching matrix is changed over such that the routing addresses can remain unchanged during extension. To this end, the routing address for a configuration which is of an appropriately small size is allocated as though the small configuration were part of the largest configuration. This is done by virtue of the personnel providing appropriate wiring. The addresses therefore remain the same. The redundancy can therefore be utilized in order to extend the switching matrix with the associated random multiplex unit without interruption.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forht in the hereafter appended claims.

~~Abstract~~

ABSTRACT OF THE DISCLOSURE

~~Method for extending the switching matrix of a communication system without interruption~~

~~If the connection capacity of a communication system is to be extended, the switching matrix, as central part, needs to be enlarged in particular. In the prior art, this is done by interrupting operation and fully disconnecting the switching matrix. After the changeover, the interrupted connections need to be set up again, which is associated with a large amount of effort in the case of ATM connections, for example. The invention provides a remedy for this~~ A method for extending the switching matrix of a communication system without interruption which is effected by reserving space for the routing addresses of the largest extension stage both in the header translation table of the interface devices and in the cell header of each ATM cell, and by providing a system split which is used to replace the old switching matrix assemblies with new switching matrix assemblies in steps, the paths via the new switching matrix assemblies, insofar as they lead to the same output-side interface devices as via the old switching matrix assemblies, being addressable using the same routing addresses.

~~Figure~~

11-14-2000
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Description

Method for extending the switching matrix of a communication system without interruption

The invention relates to a method in accordance with the precharacterizing clause of patent claim 1.

Generally, the switching matrix can be regarded as the central part of a communication system. The switching matrix has a plurality of assemblies through which the information for all the connections is routed. If the connection capacity of a communication system is to be extended, the switching matrix, as central part, needs to be enlarged in particular. This is particularly true, also, for switching matrices which connect and transmit information packaged in ATM cells.

Contemporary ATM switching matrices are extended by replacing the old switching matrix components with new components. Extension in terms of adding new components to the old components in modular fashion, with the old components being able to be used as previously, is carried out only rarely. The switching matrix therefore generally needs to be completely restructured.

This has consequences both for the operating system and for the path information of the ATM cells which are to be connected. In particular, the routing addresses which show the path to the ATM cell within the switching matrix need to be changed appropriately once the switching matrix has been changed over. During operation of the switching matrix, this cannot be done, or can be done only with great complexity. In the case of this prior art, to extend the switching matrix, operation is therefore interrupted and the switching matrix is completely disconnected. This then allows the

switching matrix to be changed over and the routing addresses to be changed.

The document "A Scalable ATM Switching System Architecture", Wolfgang Fischer et al., IEEE Journal of Selected Areas in Communications, 9(1991) October, No. 8, New York, US discloses the architecture of an ATM switching system. Specific measures to be taken in order to add equipment to the switching matrix of the ATM switching system during ongoing operation are not addressed in this case, however.

In addition, US patent specification US 5,325,089 likewise discloses an extendable ATM switching matrix. The extension is described here in detail within the context of how the individual stages need to be wired together. Specific measures to be taken in order to add equipment to the switching matrix of the ATM switching system during ongoing operation without any great complexity are also not addressed in this case.

The invention is based on the object of demonstrating a way in which switching matrices can be extended without disrupting operation.

The object is achieved, on the basis of the features specified in the precharacterizing clause of patent claim 1, by the features of the characterizing part.

An advantage of the invention is, in particular, that sufficient memory space is reserved for the routing addresses. In addition, there is the assurance that the routing addresses of the ATM cells are identical for each switching matrix type. In practice, this means that, at the actual startup of the switching matrix, the routing address is always configured for the largest switching matrix type. The routing addresses for the paths via the new switching matrix assemblies thus remain unchanged from the old ones. This means that existing connections can remain unchanged, and paths via the extended part of the switching matrix which have the already reserved extended routing addresses used for them now need only have the extended routing addresses entered for them in the extended memory space. The switching matrix is then changed over using a system split. Such a procedure has the associated advantage that the changeover can occur during ongoing operation, and existing connections do not need to be terminated.

Advantageous developments of the invention are specified in the subclaims.

The invention is explained in more detail below with reference to a figure.

Accordingly, a switching matrix ASN is shown which is split into 2 halves ASN_0 and ASN_1. In addition, redundantly arranged assemblies AMX, SMU and ASNCORE are shown which respectively form the switching matrix halves ASN_0 and ASN_1. The

assemblies AMX are in the form of ATM multiplexers whose task is to multiplex ATM cell streams onto the devices SMU which follow. The latter execute random multiplex methods, according to the rules of which ATM cells are removed from a memory (not shown in more detail) and are supplied to the devices connected downstream. The devices ASNCORE represent the core of the switching matrix ASN, which is responsible for switching through the connections. The input-side devices AMX, SMU_0, ASNCORE of the switching matrix half ASN_0 are connected to one another by means of converged lines B_0, B_1 in redundant form. The same applies to the output-side devices ASNCORE, SMU_0, AMX of the switching matrix half ASN_0. The action taken is similar in the case of the connections for the input-side and output-side devices of the switching matrix half ASN_1. Arranged on the input and output sides of the switching matrix ASN are interface devices LIC used for receiving and outputting the ATM cells.

The arriving ATM cells are split into 2 identical ATM cell streams in the interface devices LIC and are supplied via the respective input-side devices AMX, SMU, ASNCORE arranged in redundant form to the output-side devices AMX, SMU (which are likewise arranged in redundant form), where they are forwarded via the output-side interface devices LIC. There, an algorithm RPC is executed which decides which of the arriving identical ATM cells is forwarded.

A connection between 2 subscribers is now set up by virtue of a signaling cell first being transmitted from the sending subscriber to the receiving subscriber. In this process, the path which the ATM cells are later to take is stipulated. Ascertainment of this path is controlled and stored by a central computer CP. This computer thus has an up-to-date map of all connections.

In addition, routing addresses are stipulated. The routing address stipulates the output port of the switching matrix. If, by way of example, the device AMX arranged on the output side is connected to port 10 of the switching matrix ASN, the routing address contains '10' in this case. On the basis of the routing addresses, the switching matrix ASN automatically 'knows' the port to which the ATM cell needs to be routed. The routing address is also part of an internal cell header placed in front of the ATM cell in the interface device LIC.

A cell stream's ATM cells arriving in an input-side interface device LIC are now given the internal cell header, which, among other things, stipulates the path through the switching matrix in the form of a routing address. The routing address stipulates the output via which the relevant ATM cell leaves the switching matrix ASN again. In addition, the cell stream is split into 2 redundant cell streams Z_0, Z_1. The two cell streams are then supplied to the relevant output via different paths. The output-side interface device LIC associated with this output receives both cell streams Z_0, Z_1. An algorithm RPC being executed therein then decides which of the redundant ATM cells is supplied to further devices.

In addition, upon startup, all the devices of the communication system are initialized and brought up to speed. These operations are likewise controlled by the central computer CP. In addition, the length of the routing address in the internal cell header is stipulated by the hardware. This length is assigned to the assemblies in a header translation table.

The invention now provides that, upon startup of the communication system, sufficient memory space is reserved for later extension of the routing address.

This is done by placing one or more zeros in front of the actual address.

To change over the switching matrix, a system split is first performed. In this context, one half, e.g. ASN_0, of the switching matrix ASN is first disconnected by a software command. The traffic routed via the half ASN_0 is then interrupted. The cell streams routed via the second half, associated in redundant form, e.g. ASN_1, are forwarded by the algorithm RPC. If the new assemblies of the first half ASN_0 have been installed, these new assemblies are tested and activated in steps. As soon as all the assemblies of the first half are active, the traffic is transmitted via both halves again. In this intermediate state, the switching matrix is thus (briefly) operated using a switching matrix half which comprises old switching matrix assemblies and a switching matrix half which comprises new switching matrix assemblies.

Subsequently, the second half, e.g. ASN_1, is then disconnected. The traffic routed via the half ASN_1 is then interrupted. The cell streams routed via the first half, associated in redundant form, e.g. ASN_0, are forwarded by the algorithm RPC. If the new assemblies of the second half ASN_1 have been installed, the assemblies of the second half ASN_1 are tested and activated in steps. As soon as all the assemblies of the second half are active, the traffic is transmitted via both halves again.

A fundamental feature is thus that the switching matrix is changed over such that the routing addresses can remain unchanged during extension. To this end, the routing address for a configuration which is of an appropriately small size is allocated as though the small configuration were part of the largest configuration. This is done by virtue of the personnel providing appropriate wiring. The addresses therefore remain the same. The redundancy can therefore be utilized in order to extend

the switching matrix with the associated random multiplex unit without interruption.

Patent claims

1. A method for extending the switching matrix of a communication system without interruption, having a switching matrix (ASN) which is in redundant form, has a plurality of switching matrix assemblies and via which a plurality of cell streams having ATM cells are routed as stipulated by a routing address placed in front of the cell header, said routing address taking up a prescribed memory space requirement,
characterized
in that additional memory space is reserved for storing the routing address of the largest required switching matrix extension both in the header translation table and in the cell header of each ATM cell by placing one or more zeros in front of the actual address,
in that a system split is provided which is used to replace the old switching matrix assemblies with new switching matrix assemblies in steps, and in the new switching matrix assemblies, insofar as they connect paths to the same output as the old switching matrix assemblies, these paths can be addressed using the same routing addresses, and
in that the new routing addresses for the paths via the extended switching matrix are written to the additional memory space.

2. The method as claimed in claim 1,
characterized
in that the system split is performed by disconnecting half (ASN_0) of the old switching matrix and replacing it with a new switching matrix half, the cell streams being routed via the remaining half (ASN_1) of the old switching matrix, and
in that, once the exchange has been made, the disconnected half is started up again using the new switching matrix, as a result of which one half of

the switching matrix is operated using a new switching matrix half,

switching matrix half, the cell streams being routed via the half (ASN_0) of the switching matrix which is already new,
in that, once the exchange has been made, the remaining half (ASN_1) is started up again using the new switching matrix.

3. The method as claimed in claim 1, 2,
characterized
in that, in input-side interface devices (LIC), the cell header of each ATM cell has an internal cell header placed in front of it which is used to hold the routing addresses and is removed again in output-side interface devices (LIC).

4. The method as claimed in one of the preceding claims,
characterized
in that, in the input-side interface devices (LIC), the arriving cell streams are split into 2 separate, identical cell streams (Z_0, Z_1) by dint of a first cell stream (Z_0) being routed via one half of the switching matrix (ASN_0), and a second cell stream (Z_1), which is identical to the first cell stream, being routed via the remaining half of the switching matrix (ASN_1) to the same output-side interface devices (LIC), as stipulated by the routing address placed in front of the cell header.

5. The method as claimed in one of the preceding claims,
characterized
in that the additional memory space is reserved for the largest required switching matrix extension both in the header translation table and in the cell header of each ATM cell.

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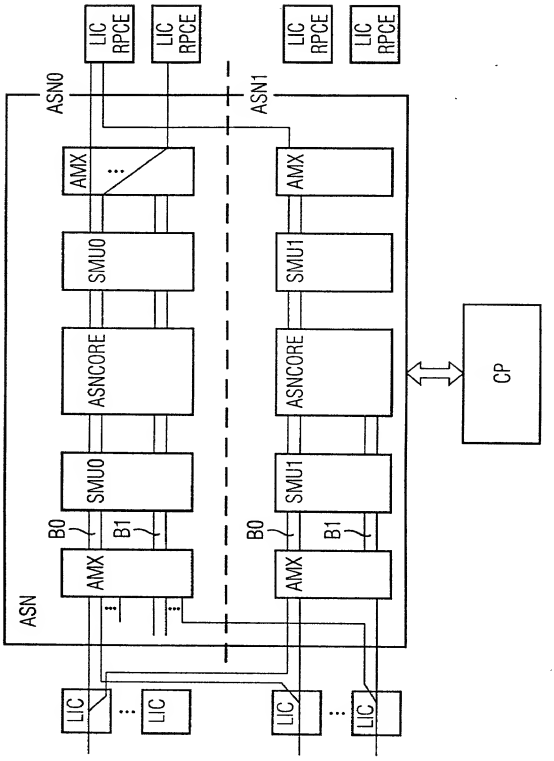
Abstract

Method for extending the switching matrix of a communication system without interruption

If the connection capacity of a communication system is to be extended, the switching matrix, as central part, needs to be enlarged in particular. In the prior art, this is done by interrupting operation and fully disconnecting the switching matrix. After the changeover, the interrupted connections need to be set up again, which is associated with a large amount of effort in the case of ATM connections, for example. The invention provides a remedy for this by reserving space for the routing addresses of the largest extension stage both in the header translation table of the interface devices and in the cell header of each ATM cell, and by providing a system split which is used to replace the old switching matrix assemblies with new switching matrix assemblies in steps, the paths via the new switching matrix assemblies, insofar as they lead to the same output-side interface devices as via the old switching matrix assemblies, being addressable using the same routing addresses.

Figure



Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Verfahren zum unterbrechungsfreien Erweitern des Koppelfeldes eines Kommunikationssystems

Method for expanding the switching network of a communications system without interrupting operation

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)
☐ hier beigefügt ist.
☒ am 17.11.1999 als PCT internationale Anmeldung PCT Anmeldungsnummer PCT/DE99/03655 eingereicht wurde und am _____ abgeändert wurde (falls tatsächlich abgeändert).

(check one)
☐ is attached hereto.
☒ was filed on 17.11.1999 as PCT international application PCT Application No. PCT/DE99/03655 and was amended on _____ (if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

U.S. APPLICATION NO. (IF K[illegible], SEE 37 CFR	INTERNATIONAL APPLICATION [illegible]	ATTORNEY'S DOCKET NUMBER
09/856,064	PCT/DE99/03655	112740-220

21. The following fees are submitted:	CALCULATIONS PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :	
☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1,000.00**	
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$860.00**	
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$710.00**	
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$690.00**	
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**	
ENTER APPROPRIATE BASIC FEE AMOUNT =	**$0.00**
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☒ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$130.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	- 20 =	0	x $18.00	**$0.00**
Independent claims	- 3 =	0	x $80.00	**$0.00**
Multiple Dependent Claims **(check if applicable).**			☐	**$0.00**
TOTAL OF ABOVE CALCULATIONS			=	**$130.00**
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) **(check if applicable).**			☐	**$0.00**
SUBTOTAL			=	**$130.00**
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).			+	**$0.00**
TOTAL NATIONAL FEE			=	**$130.00**
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).**			☐	**$0.00**
TOTAL FEES ENCLOSED			=	**$130.00**
			Amount to be: refunded	$
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☒ A check in the amount of **$130.00** to cover the above fees is enclosed.

☐ Please charge my Deposit Account No. in the amount of to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **02-1818** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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REGISTRATION NUMBER

September 6, 2001
DATE

German Language Declaration

Prior foreign applications
Priorität beansprucht

			Priority Claimed	
19853068.4	DE	17.11.1998	☒	☐
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein
			☐	☐
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein
			☐	☐
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/DE99/03655	17.11.1999		
(Application Serial No.)	(Filing Date D, M, Y)	(Status)	(Status)
(Anmeldeseriennummer)	(Anmeldedatum T, M, J)	(patentiert, anhängig, aufgegeben)	(patented, pending, abandoned)
(Application Serial No.)	(Filing Date D,M,Y)	(Status)	(Status)
(Anmeldeseriennummer)	(Anmeldedatum T, M; J)	(patentiert, anhängig, aufgeben)	(patented, pending, abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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(Supply similar information and signature for third and subsequent joint inventors).

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Wohnsitz	Residence
Staatsangehörigkeit	Citizenship
Postanschrift	Post Office Address
Voller Name des sechsten Miterfinders:	Full name of sixth joint inventor:
Unterschrift des Erfinders Datum	Inventor's signature Date
Wohnsitz	Residence
Staatsangehörigkeit	Citizenship
Postanschrift	Post Office Address

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).